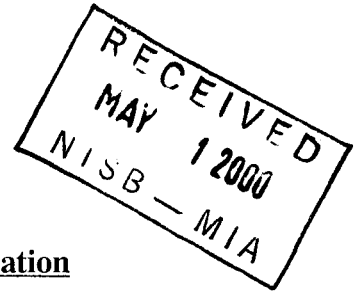


**NATIONAL TRANSPORTATION SAFETY BOARD
Office of Aviation Safety
Washington, D.C. 20594**

April 26, 2000



Structures Group Chairperson's Factual Report of Investigation

MIA99FA245

A. ACCIDENT

Location : Palm Beach International Airport, West Palm Beach, Florida

Date : September 03, 1999

Time : 0355 Eastern Standard Time (EST)

Aircraft : Beechcraft B90 King Air, N338AS
Operated by CP Horizons, Inc.

B. STRUCTURES GROUP

Chairperson : Lorenda Ward
National Transportation Safety Board
Washington, D.C.

Member : Harold R. Barrentine
Raytheon Aircraft Company
Wichita, Kansas

Member : Hazel M. Jones
Federal Aviation Administration
Ft. Lauderdale, Florida

C. SUMMARY

On September 03, 1999, at 0327 EST, a Beechcraft B90 King Air, N338AS, serial number LJ-93, was destroyed by impact forces and a post crash fire when it struck a building and came to a rest in a cluster of trees a ½ mile short of runway 13 at the Palm Beach International Airport, West Palm Beach, Florida. The airplane was being operated as a CFR Part 91 flight that originated from Pontiac, Michigan. The flight was enroute to Boca Raton, Florida when the pilot requested an immediate approach to Palm Beach. ATC cleared the aircraft for a visual approach to runway 13. Shortly thereafter, the pilot transmitted a mayday call. A witness stated that the engine

sounds were changing just before the crash. The pilot, student rated/passenger¹, and seven passengers were fatally injured.

The structures group was formed to record and document the pertinent information regarding the airplane's structure. The group began its investigation on September 03, 1999 and concluded the on-site/hanger investigation on September 04, 1999. This factual report summarizes the structures group findings for all on-site and follow-up activities. Supporting documentation, including tri-view of the King Air B90 (Appendix A), photographs (Appendix B), and overall airplane damage (Appendix C), is attached.

D. DETAILS OF THE INVESTIGATION

1.0 Wreckage Distribution

The aircraft was destroyed by impact forces and a small post crash fire. The airplane's left wing and empennage were separated from the fuselage but remained attached by cables. All of the airplane was accounted for at the accident site. There was ground scarring leading to the main wreckage. The airplane was found with the cabin inverted with the left wing folded forward along the fuselage and the empennage rotated 180 degrees about the longitudinal axis and to the left of the fuselage. The right wing was resting on a fence and up against a palm tree. There was no evidence of metal splattering, soot streaking, or heat damage along any horizontal plane. All the heat damage was vertical and the melted metal was found directly beneath the fuselage. No evidence of an in-flight structural failure or an in-flight fire was found at the accident site.

The right main landing gear wheel assembly and piston were found in a pool warehouse, approximately 100 feet away from the wreckage site. The left main tire and fractured pieces of the wheel's rim were found north of the pool warehouse, approximately 200 feet away. The nose gear was found before the fence line, next to a dumpster approximately 25 feet from the main wreckage. A few personal effects were found prior to the main wreckage site. There was evidence of black rubber markings on the top corner of the pool warehouse. There were two depressions created by the airplane in the pool warehouse's roof, with one depression penetrating through the surface.

¹ The owner/operator of the airplane held a third class medical license and was occupying the right seat of the single pilot turbo-prop airplane.

2.0 Structures Group Examination

2.1 Fuselage

The King Air B90 fuselage is approximately 35 feet long. The nose cone is approximately 6 feet long. There is a total of ten cabin windows and six cockpit windows. There is an emergency escape hatch on the right side and a stair door on the left side.

All of the fuselage structure was found at the wreckage site. About 80% of the structure was destroyed by post crash fire and impact forces. The left wing was separated from the fuselage but the right wing remained attached. The empennage was connected to the fuselage only by the flight control cables. The nose cone was crushed back to the forward pressure bulkhead, FS 84, with post-crash fire damage starting from the crushing damage and extending aft on the left side of the fuselage. The cockpit windows were crazed from the ground impact. The cockpit had extensive fire damage. Refer to the systems group chairman's report for the cockpit documentation.

During the recovery process, the forward fuselage was chain cut at the left FS 166.90, and continued circumferally around through to the right FS 186.37. There was heavy sooting and bare metal showing on the outer skin.

The right hand side of the fuselage had extensive fire damage; sooting, bare metal, and paint discoloration, starting at FS 166.90 and continuing from the window down and moving aft to FS 216.00. The right wing was still attached. The emergency exit hatch was still in place and the locking mechanism was engaged. For passenger removal the rescue team cut through the right FS 266.25 and continued horizontally to FS 166.9.

The VHF antenna was crushed and folded over to the left side. There were faint scrape marks and crushing/buckling along the upper surface of the cabin.

Fire damage on the left hand side of the fuselage started at FS 166.90 down and aft to FS 216.00, with bare metal, sooting and paint discoloration. The top was crushed down at FS 166.90 approximately 15 degrees. There was extensive fire damage to the cabin flooring all the way back to the baggage compartment. There was spider webbing of the left rear passenger window at FS 206.12.

The left hand side of the empennage separated in approximately the same location as the right hand side and was attached to the fuselage by the flight control cables. The lower surface was bowed up, with the aft end being folded under approximately 75 degrees. From the aft pressure bulkhead, FS 298, back to the empennage there was a zipper effect along the longitudinal rivet line where the tail separated from the fuselage. FS 319.00 lower right corner frame was bent forward.

The stair door was intact, stowed and locked. During the hanger examination the door was unlatched and it opened.

2.2 Wings

The wing flight control surfaces consist of an aileron and an inboard and outboard flap.

Left Wing

The left wing, approximately 13 feet 7 inches, was separated from the fuselage by tree impact damage, but was located along side the wreckage. The pitot tube was intact. From the outboard tip to the landing lights there was impact damage. Starting at the inboard side of the separated section of the left wing there was heavy fire damage continuing out approximately 5 feet where there was just sooting with light paint discoloration.

Approximately 37 inches from the wing tip and moving 42 inches inboard, the left wing's main spar up to the leading edge had crushing damage. There was a prop strike mark through the outboard edge of the wing tank cover, approximately 122 inches from the wing tip, and penetrating through the entire wing structure. There was compression damage and buckling on the upper skin continuing to the trim tab point. The trailing edge exhibited minor impact damage.

The left wing's bathtub attachment bolt was installed. The main spar from the bathtub bolt to 2 feet inboard is bowed forward, with the inboard end deformed forward and down.

The left aileron had minor impact damage and was still attached to the left wing. There was a tear at the outboard trim tab rivet line. The inboard attachment for the left aileron had heavy sooting and the inboard pushrod was broken off. The upper skin for the wing at this location was crushed up. The middle attachment for the left aileron was crushed down and the middle pushrod eyebolt was deformed inboard. The outboard pushrod was broken off. There was paint discoloration starting inboard and continuing approximately 7 inches outboard. There was no horizontal streaking.

The outboard flap had paint discoloration extending from the outboard edge to 2 feet inboard. There was heavy sooting and bare metal after the 2 feet mark. Approximately 56 inches of outboard flap was still attached to the left wing. The inboard flap was not attached and was found approximately 25 feet from the main wreckage.

The leading edge of the left wing's fuselage attachment was bent up approximately 20 degrees and aft 10 degrees. Approximately 1 to 1 ½ feet of the left wing's main spar, at the fuselage mating point, remained and was crushed down approximately 40 degrees with post-crash fire damage; molten metal, heavy sooting, and paint discoloration.

The left engine nacelle had fire damage to the lower skin and extensive fire damage 34 inches continuing aft. There was ground impact damage to the three propellers. Refer to the Systems Group Chairman Factual Report powerplant section for more details.

Right Wing

There was 45 degree compression damage across the right wing and progressing through the right aileron.

The right aileron was bent down and aft 36 inches from the wing tip. The outboard aileron hinge was ripped out from the rear spar.

There was tree impact damage, 25 inches in diameter, on the outboard flap. There were wood particles embedded in the flap. The outboard flap was pushed forward into the rear spar. Approximately 1 foot from the fracture, the outboard flap was bent up. The right inboard flap had a small ding on the trailing edge, otherwise there was no damage. There was crushing damage on the outboard side of the lower skin, where the inboard and outboard flap meet on the wing.

The right engine nacelle was bent to the left 45 degrees and torn outboard away from its mating point 17 inches from the leading edge. From the mating point of the engine outboard there is impact damage on the leading edge for 23 inches (up to deicing boot) and aft 17 inches. The right engine nacelle lower surface was punctured. Refer to the Systems Group Chairman Factual Report powerplant section for more details.

The next leading edge damage was a section that started approximately 76 ½ inches outboard from the engine nacelle and continued out to the wing tip and was pushed aft 4 ½ inches. There was grass debris in the landing lights.

2.3 Empennage

The empennage was separated from the fuselage at the aft pressure bulkhead but still had the flight control cables attached. The left hand side of the empennage had tree impact damage, approximately 21 inches in diameter, with tree scrape marks and black scrape marks transversing vertically. The lower skin was missing from the fracture to the bulkhead. The tail light assembly was partially separated from the vertical fin. The rudder and trim control surfaces were still attached and intact.

The vertical fin attachment was torn from the forward section of the empennage with the rivet holes pulled in tension.

Two feet from the top of the vertical fin, on the left hand side, there were numerous brown scrape marks. There were a few brown scrape marks 19 inches from the top of the fin.

The leading edge of the vertical fin had tree impact damage 16 inches from the top, which was 10 inches long and 8 inches deep. Brown scrape marks were in the same location. There was additional tree impact damage 57 inches from the top of the vertical fin with brown scrape marks and tree particles embedded in the damage.

The left stabilator had a tree impact damage, 14 inches in diameter, on the leading edge 16 inches outboard. There were tree particles in the damage. Approximately 1 foot of the forward section of the left stabilator was separated from the empennage. There was minor impact damage on the outboard leading edge. The outboard tip was crushed down.

The left elevator counterweight was still attached. The left elevator had brown scrape marks on the outboard portion of the upper skin. The elevator to stabilator attachments were okay. There was minor crushing along the attachment points. The lower skin of the left elevator was undamaged 1 ½ inches from outboard. There was tree debris between the elevator and stabilator.

The left hand side of the rudder had tree scrape marks starting 1 foot from the top and extending another foot with tree impact damage in that area. The trim tab had matching impact. The rudder to vertical fin attachment points were okay.

The right hand side of the vertical fin attachment to the empennage had fire damage consisting of bubbles in the paint. The vertical fin and rudder had minor paint discoloration.

The right stabilator 46 inches outboard was bent down 70 degrees and was pulled back 16 inches from the empennage. The upper surface, 46 inches outboard continuing out to the tip, had sooting and paint discoloration. In the same location, the deicing boots were melted with bare metal showing in spots. There was no fire damage on the first 46 inches of the right stabilator upper and lower skins.

The right elevator counterweight was attached. There was fire damage starting at the bend 46 inches outboard, consisting of bare metal, sooting and paint discoloration. The elevator to stabilator attachment was okay. The outboard 2 elevator hinges were bent right and down.

2.4 Landing Gear

The nose landing gear had dirt and scrapings on piston. The tire and wheel were intact, with the lower drag brace still attached. The drag brace assembly was broken at the upper drag brace lug.

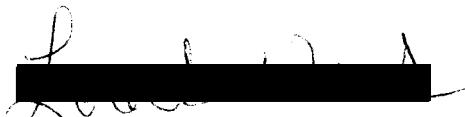
The right main gear was found in a pool warehouse with the piston, wheel, brake and tire assembly still intact. The right main landing gear doors were open and the remaining right main landing gear cylinder was protruding and pushed aft.

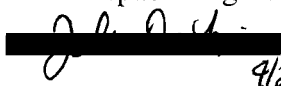
The left main landing gear's outboard attachment to the main spar was intact with minor damage to the outer flange. There was ash colored fire damage in this area. The left main landing gear's inboard attachment fitting was detached from the main spar at the bearing but the bearing was still attached to the gear.

The left main landing gear's main spar web was deformed forward. The main spar upper cap from the bathtub inboard bolt was bent up and forward 10 inches inboard. From 10 inches inboard the upper cap was bent aft. There was a fracture at bolt hole (10 inches). There was crushing in the web.

The down locking arm was broke. The actuator was extended 8 ½ inches from center of the nut. The fire damage was all the way to bare metal.

The left main landing gear outer wheel rim was fractured into two pieces and found North of the pool warehouse. The tire was also found North of the pool warehouse. The piston, partial wheel and brake assembly were found together as a group. The lower drag brace was attached but broken at the upper drag brace lug.


Lorenda Ward
Aerospace Engineer


9/27/00

Structures Group Chairperson's Factual Report

APPENDIX A

Tri-View of the King Air B90

NTSB Aircraft Accident Case No. MIA99FA245
West Palm Beach, Florida
September 03, 1999
Beechcraft B90 King Air, N338AS

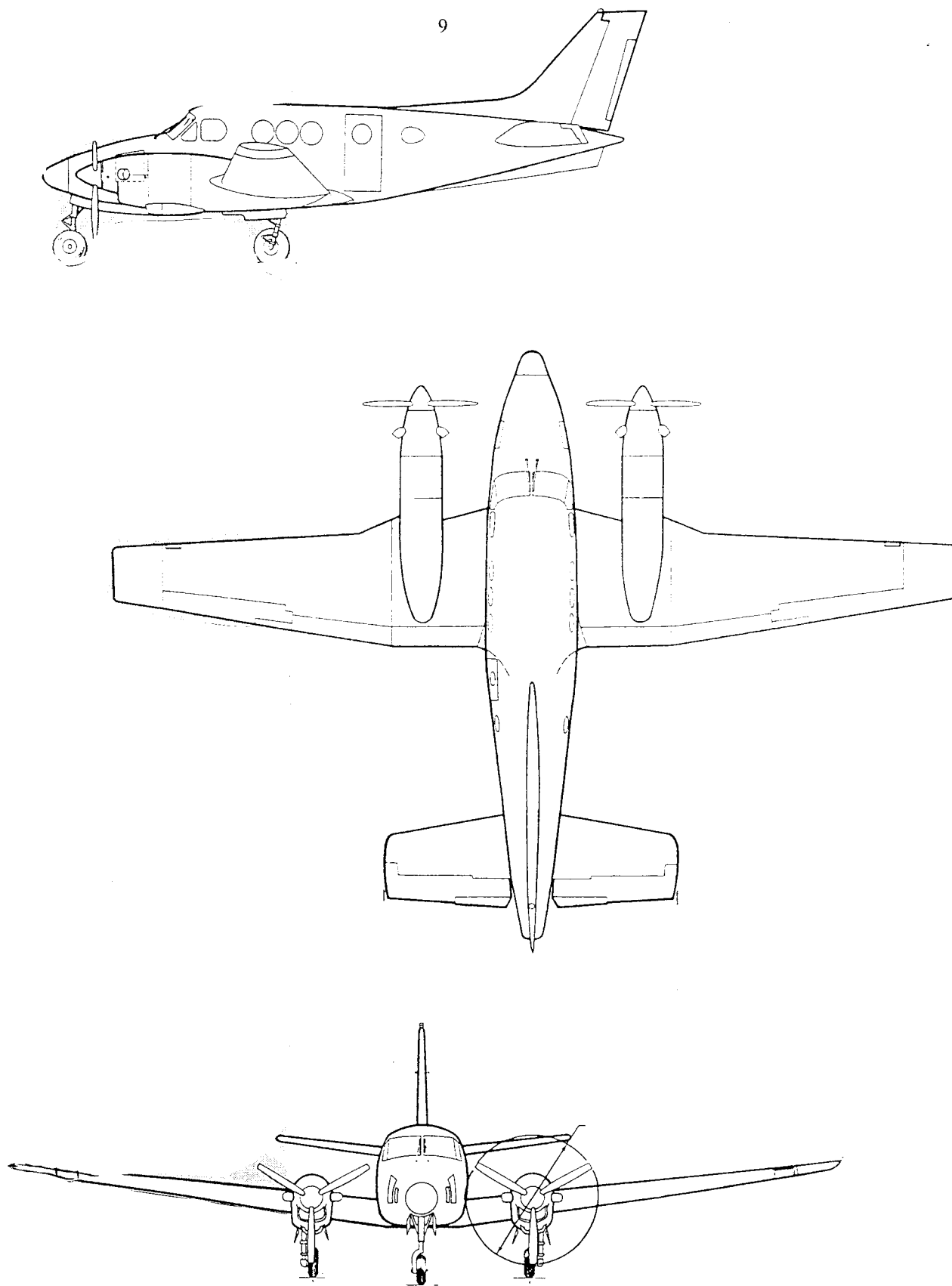


Figure 1. Tri-View of the King Air B90.

Structures Group Chairperson's Factual Report

APPENDIX B
Photographs

NTSB Aircraft Accident Case No. MIA99FA245
West Palm Beach, Florida
September 03, 1999
Beechcraft B90 King Air, N338AS



Photo #1. Aerial View of Runway 13. The arrow points to wreckage location.

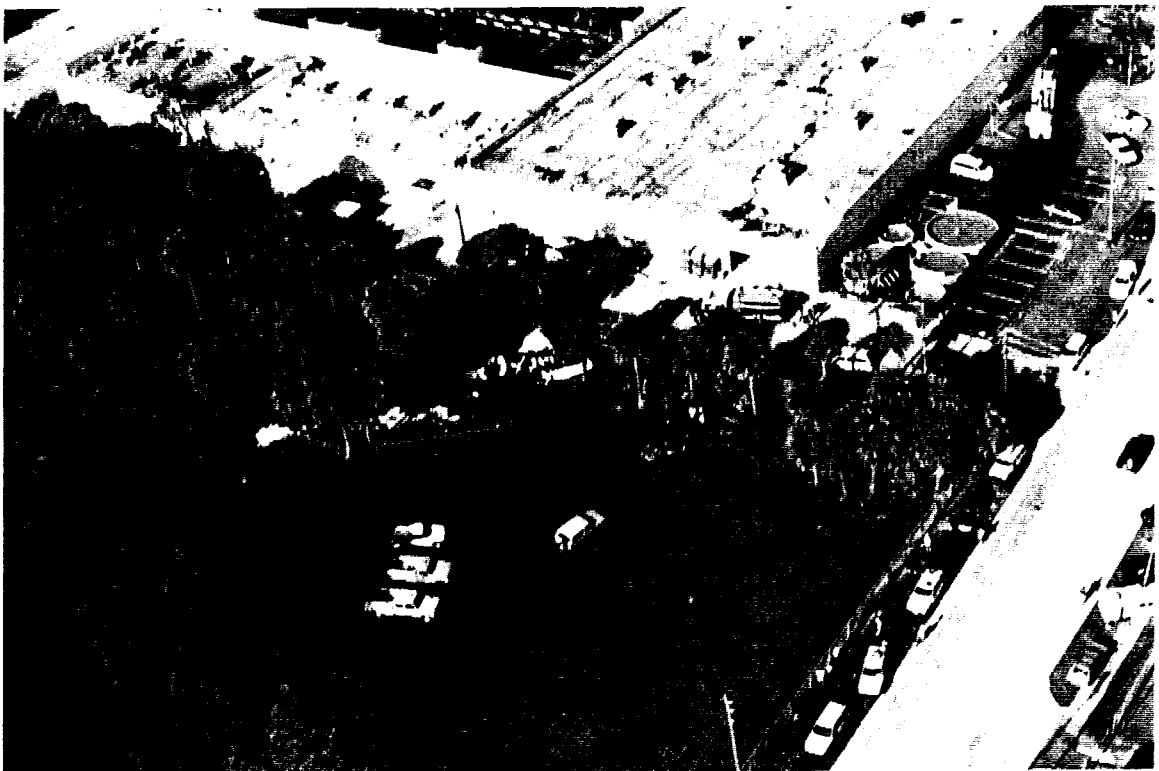


Photo #2. Aerial View of the Pool Warehouse and the Wreckage Site. The arrow points to the location of where the King Air B90 first contacted the building.



Photo #3. View of the roof of the Pool Warehouse. The arrows point to where the King Air B90 contacted the building. Arrow #1 points to where the fuselage contacted the building. Arrow #2 points to where the right hand main landing gear punched through the building.



Photo #4. View of the Wreckage Site. Arrow #1 points to the right wing. Arrow #2 points to the nose landing gear. Arrow #3 points to the left inboard flap. Arrow #4 points to the left wing. Arrow #5 points to the vertical fin.



Photo #5. View of Wreckage Site. Arrow #1 points to the paint discoloration on the right hand side of the vertical fin and rudder. Arrow #2 points to the prop strike through the left wing.



Photo #6. View of the wreckage site. Arrow #1 points to the right main landing gear doors. Arrow #2 points to the emergency escape hatch.



Photo #7. The Left Side of the Empennage. Arrow #1 points to the tree impact damage on the leading edge of the stabilator. Arrow #2 points to the tree impact damage on the empennage. Arrow #3 points to tree impact damage on the leading edge of the vertical fin. Arrow #4 points to tree impact damage on the leading edge of the vertical fin.



Photo #8. Right Side of the Empennage.



Photo #9. Nose Landing Gear.



Photo #10. Right Main Landing Gear.

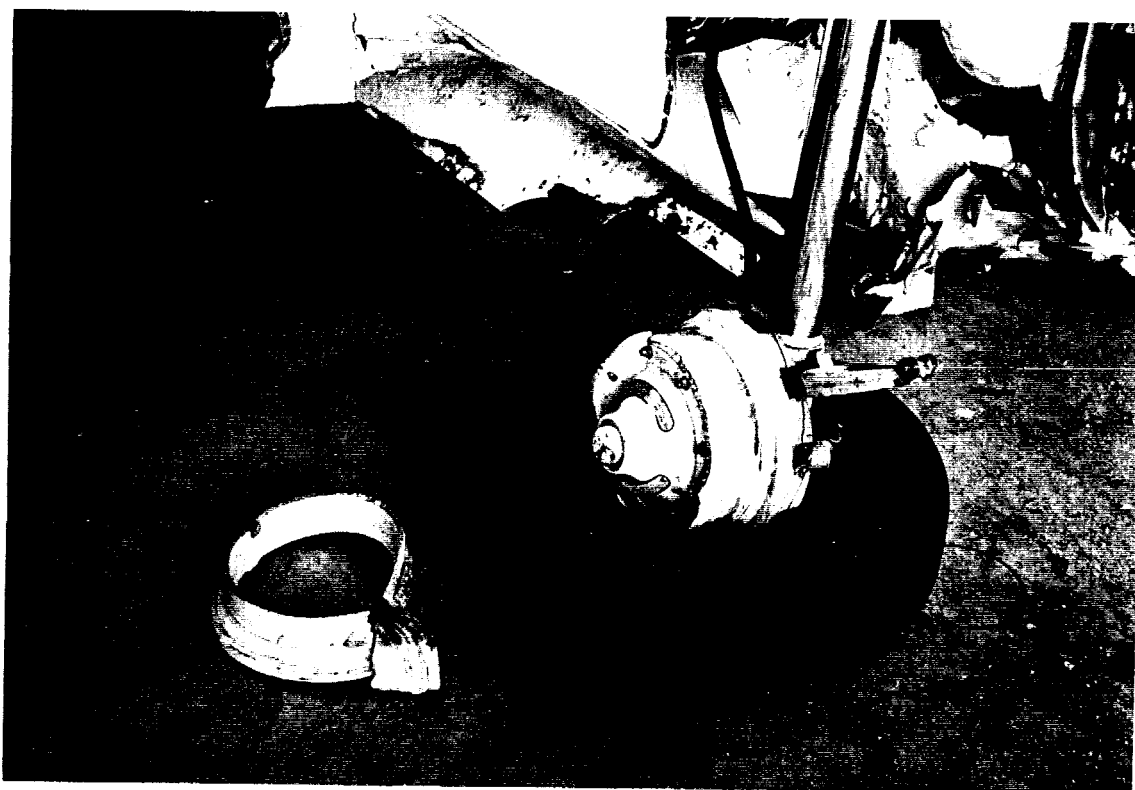


Photo #11. Left Main Landing Gear.

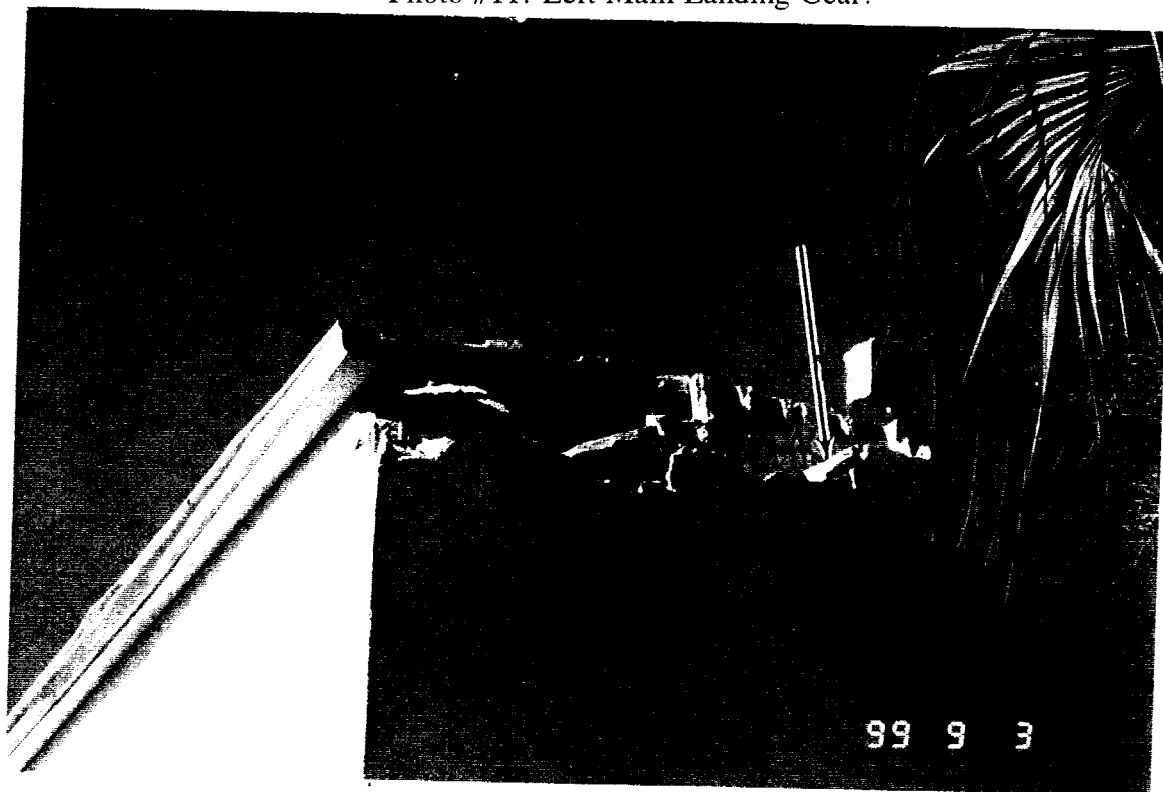


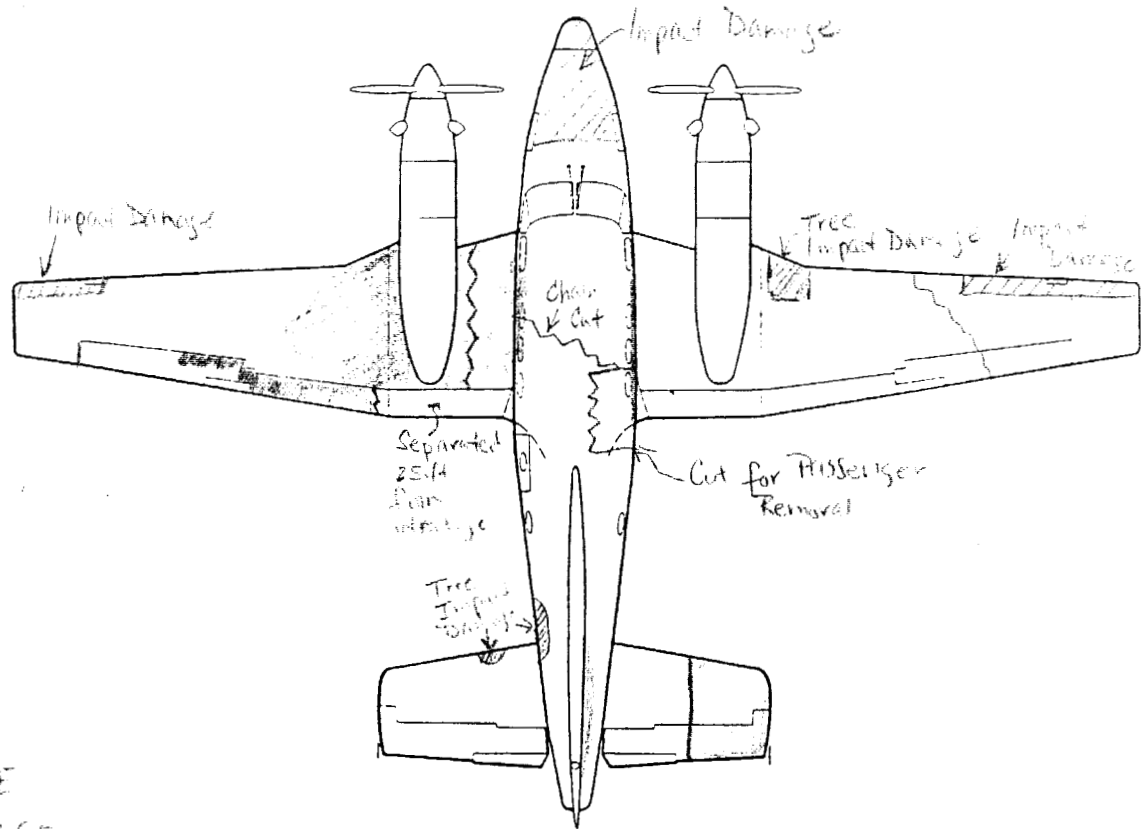
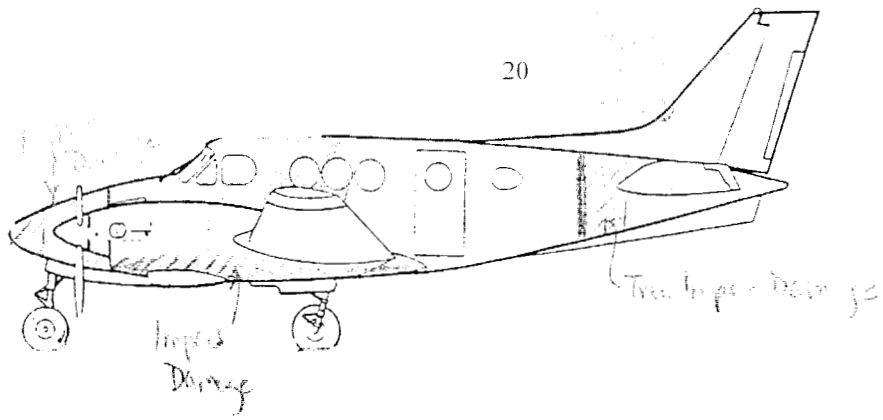
Photo #12. Tire Mark on Pool Warehouse.



Structures Group Chairperson's Factual Report

APPENDIX C

Diagram of the Overall Aircraft Damage

NTSB Aircraft Accident Case No. MIA99FA245
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Beechcraft B90 King Air, N338AS



 - FIRE DAMAGE
 - IMPACT DAMAGE

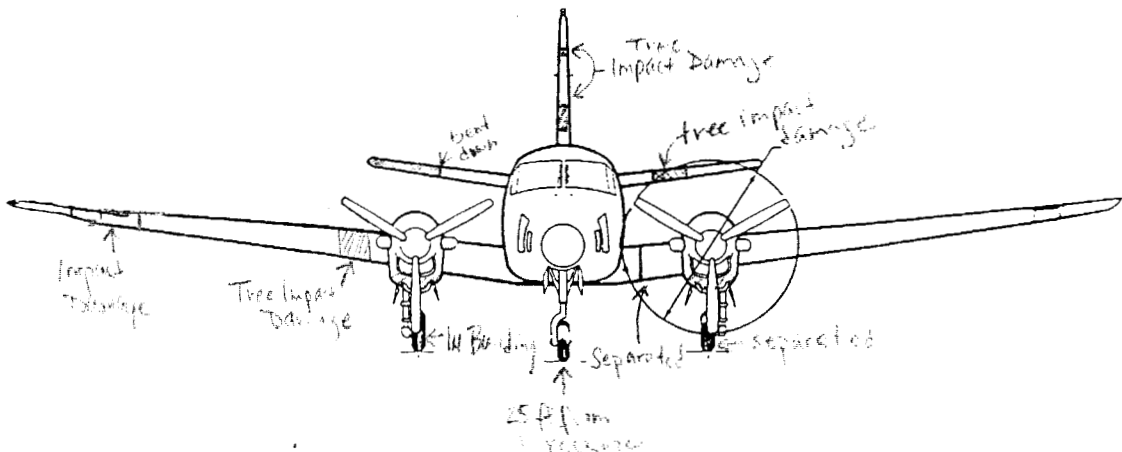


Figure 1. Diagram of the Overall Airplane Damage.